

Amendments to the Specification:

The applicants request that certain language be entered into the Specification on page 13: line 4. The language should be entered after the paragraph ending "See FIG. 2F." and before the paragraph beginning: "Next, as illustrated ...". The applicants request that the following language be entered:

-- Moreover, as illustrated in FIG. 2F', in another embodiment a calcium implant 234 is angularly directed to form a barrier layer 235 on the trench sidewalls. In one embodiment, the calcium ions are implanted into the sidewalls using tilted calcium ion implantation, or alternatively a combination of tilted and non-tilted calcium ion implantation. As described previously, the implantation can be a 4-way rotation implantation. Also as previously described, the tilted implantation incorporates calcium atoms into sidewalls. Also, the bottom of the trench can be implanted using a non-tilt (0 degree tilt) wafer setup, such as shown in FIG. 2F. Implantation energies can range from about 1 to 80 keV, more specifically from 10 to 20 keV. Ion doses can range from about $1 \times 10^{14} \text{ cm}^{-2}$ to $1 \times 10^{16} \text{ cm}^{-2}$. The tilted implant 234 is generally conducted at a tilt angle ranging from about 0 to 30° (relative to a line perpendicular to the bottom of the trench), in one example implementation about 7° . Under such conditions, a thin calcium doped dielectric layer 235 may be formed on the sidewalls of the trench. It is desirable to provide a peak concentration of Ca atoms at a depth of about 50 to 500 Angstroms from the exposed surface of the trench sidewall, i.e., the surface that in the final configuration lies adjacent to the copper interconnect. It should be noted that the maximum tilt angle is determined by the geometric shape of the trench. The angle should be selected so that sufficient levels of calcium atoms are incorporated beneath the surfaces of the trench sidewalls. The number of rotations (or number of twist angles with fixed angular increments) during this implant is determined by the layout of the different trenches on the chip and may vary, but 4 rotations can be used to produce symmetric calcium profiles in the trenches. For example, sidewalls can be doped, using 4 rotations at about 7° tilt with a Ca ion dose ranging from about $1 \times 10^{14} \text{ cm}^{-2}$ to $1 \times 10^{16} \text{ cm}^{-2}$. --